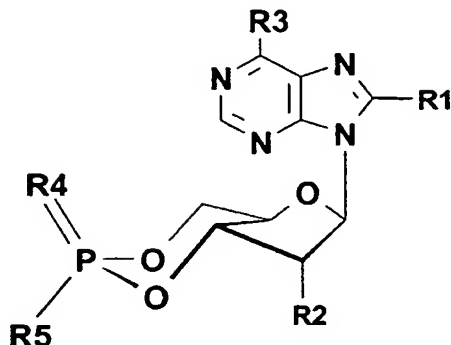


## Claims

1. Compound having the structural formula (I)



5 and deaza-analogues thereof, wherein:

$R_1$  can be independently H, halogen, azido, alkyl, aryl, amido-alkyl, amido-aryl, OH, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, SeH, Se-alkyl, Se-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, cycloalkylamino;

10  $R_2$  can be independently H, halogen, azido, O-alkyl, S-alkyl, Se-alkyl, NH-alkyl, N-bisalkyl, alkyl-carbamoyl, cycloalkylamino, silyl;

$R_3$  can be independently H, halogen, OH, azido, amido-alkyl, amido-aryl, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, NH-alkyl-carbamoyl, cycloalkylamino;

and wherein

$R_4$  is O(H) or S(H); and

20  $R_5$  is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; or

$R_4$  is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; and

$R_5$  is O(H) or S(H);

25 and pharmaceutically acceptable salts, esters, and/or solvates thereof,

with the exception of 2'-deoxyadenosine-3',5'-cyclic monophosphate; N<sup>6</sup>-monobutyl-2'-deoxyadenosine-3',5'-cyclic

monophosphate; 2'-deoxyadenosine-3',5'-cyclic  
monophosphorothioate;; 2'-deoxyadenosine-3',5'-cyclic  
monophosphoroanilidate; 2'-deoxyadenosine-3',5'-cyclic  
monophosphate methyl triester; 2'-deoxyadenosine-3',5'-cyclic  
5 monophosphate ethyl triester; 2'-O-methyladenosine-3',5'-  
cyclic monophosphate; ; 2'-O-ethyladenosine-3',5'-cyclic  
monophosphate; 2'-O-n-propyladenosine-3',5'-cyclic  
monophosphate; 2'-O-n-butyladenosine-3',5'-cyclic  
monophosphate; 2'-O-iso-butyladenosine-3',5'-cyclic  
10 monophosphate; 2'-O-methyladenosine-3',5'-cyclic  
monophosphate methyl triester; 2'-O-methyladenosine-3',5'-  
cyclic monophosphate phenyl triester.

2. Compound as claimed in claim 1, wherein  
15 R<sub>1</sub> is H, halogen, azido, O-alkyl, O-aryl, S-alkyl, S-  
aryl, NH-alkyl, NH-aryl, Se-aryl.

3. Compound as claimed in claim 1 or 2, wherein  
R<sub>1</sub> is H, halogen, azido, O-alkyl, O-aryl, S-alkyl, S-  
20 aryl, NH-alkyl, NH-aryl, Se-aryl.

4. Compound as claimed in claim 1, 2 or 3, wherein  
R<sub>1</sub> is H, Br, Cl, I, azido, 2-chlorophenylthio, 3-  
chlorophenylthio, 4-chlorophenylthio, 2-bromophenylthio, 3-  
25 bromophenylthio, 4-bromophenylthio, methylamino, methylthio,  
ethylthio, n-propylthio, n-butylthio, n-pentylthio, n-  
hexylthio, 2-fluorophenylthio, 3-fluorophenylthio, 4-  
fluorophenylthio, 4-methylcumariny, naphthyl-2-thio,  
phenylthio, 4-nitrophenylthio, 2-aminophenylthio, 3-  
30 aminophenylthio, 4-aminophenylthio, benzylthio,  
phenylethylamino, 3-phenyl-propylamino, 2-methoxyphenylthio,  
3-methoxyphenylthio, 4-methoxyphenylthio, isopropylthio,  
benzimidazolyl-2-thio, 2-hydroxyethylthio, 2-aminoethylthio,  
pyridinylthio, benzothiazolylthio, 2-methylphenylthio, 3-

5 methylphenylthio, 4-methylphenylthio, 2-isopropylphenylthio, 4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy, ethoxy, propoxy, butoxy, benzyloxy, 4-methylbenzyloxy, 4-methoxybenzyloxy, 4-fluorobenzyloxy, 4-chlorobenzyloxy, 4-bromobenzyloxy, phenyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-isopropoxyphenylthio, 4-methylthiophenylthio, 6-aminoethylamino, 2,3-dichlorophenylthio, 2,5-dichlorophenylthio, 2,4-difluorophenylthio, 2,5-dimethoxyphenylthio, 2,5-dimethylthiophenylthio, 2,6-dimethylthiophenylthio, 2,6-dichlorophenylthio.

5. Compound as claimed in any of the claims 1-4, wherein  
15 R<sub>1</sub> is H, Br, Cl, azido, 2-chlorophenylthio, 3-chlorophenylthio, 4-chlorophenylthio, 2-bromophenylthio, 3-bromophenylthio, 4-bromophenylthio, methylamino, methylthio, ethylthio, n-propylthio, n-butylthio, n-pentylthio, n-hexylthio, 2-fluorophenylthio, 3-fluorophenylthio, 4-fluorophenylthio, 4-methylcumariny, naphthyl-2-thio, phenylthio, 4-nitrophenylthio, 2-aminophenylthio, 3-aminophenylthio, 4-aminophenylthio, benzylthio, phenylethylamino, 2-methoxyphenylthio, 3-methoxyphenylthio, 4-methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-hydroxyethylthio, 2-aminoethylthio, pyridinylthio, benzothiazolylthio, 2-methylphenylthio, 3-methylphenylthio, 4-methylphenylthio, 2-isopropylphenylthio, 4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy, benzyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-isopropoxyphenylthio, 4-methylthiophenylthio, 6-aminoethylamino, 2,3-dichlorophenylthio, 2,5-dichlorophenylthio, 2,4-difluorophenylthio, 2,5-

dimethoxyphenylthio, 2,5-dimethylthiophenylthio, 2,6-dimethylthiophenylthio, 2,6-dichlorophenylthio.

6. Compound as claimed in any of the claims 1-5, wherein

5         $R_1$  is H, Br, Cl, azido, 4-chlorophenylthio, methylamino, methylthio, 4-fluorophenylthio, 4-methylcumariny, naphthyl-2-thio, phenylthio, 4-nitrophenylthio, 2-aminophenylthio, benzylthio, n-hexylthio, phenylethylamino, 4-methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-hydroxyethylthio, ethylthio, 2-aminoethylthio, pyridinylthio, 10        benzothiazolylthio, 4-methylphenylthio, 3-methoxyphenylthio, 4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy, benzyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-15        isopropoxyphenylthio, 4-methylthiophenylthio, 6-aminoethylamino.

7. Compound as claimed in any of the claims 1-3, wherein  
20         $R_1$  is Cl, Br or S-aryl.

8. Compound as claimed in claim 7, wherein

20         $R_1$  is Cl, Br, 4-chlorophenylthio, 4-fluorophenylthio, naphthyl-2-thio, phenylthio, 4-nitrophenylthio, 4-methoxyphenylthio, pyridinyl-2-thio, 4-methylphenylthio, 4-25        isopropylphenylthio, 2,3,5,6-tetrafluoro-phenylthio, 4-hydroxyphenylthio, or 2,4-dichloro-phenylthio.

9. Compound as claimed in claim 7 or 8, wherein

30         $R_1$  is 4-chlorophenylthio, 4-fluorophenylthio, 4-methoxyphenylthio, 4-methylphenylthio, 4-hydroxyphenylthio.

10. Compound as claimed in any of the claims 1-9, wherein

$R_2$  is H, halogen, azido, O-alkyl, S-alkyl.

11. Compound as claimed in any of the claims 1-10,  
wherein

R<sub>2</sub> is H, Cl, Br, I, O-alkyl, S-methyl, S-ethyl.

5 12. Compound as claimed in any of the claims 1-11,  
wherein

R<sub>2</sub> is H, Cl, Br, O-methyl, O-ethyl, O-propyl, O-butyl,  
O-isobutyl, S-methyl.

10 13. Compound as claimed in any of the claims 1-13,  
wherein

R<sub>2</sub> is O-methyl, O-ethyl, O-propyl, O-butyl, O-isobutyl.

14. Compound as claimed in any of the claims 1-13,  
15 wherein

R<sub>2</sub> is O-methyl.

15. Compound as claimed in any of the claims 1-14,  
wherein

20 R<sub>3</sub> is amino, NH-alkyl, N-bisalkyl, NH-aryl, NH-alkyl-  
carbamoyl, N-bisalkyl-carbamoyl, amido-alkyl, amido-aryl, OH.

16. Compound as claimed in any of the claims 1-15,  
wherein

25 R<sub>3</sub> is amino, NH-phenyl, NH-tert-butyl, NH-tert-  
butylcarbamoyl, NH-phenylcarbamoyl, NH-acetyl, NH-propionyl,  
NH-butyryl, NH-benzoyl, NH-benzyl, NH-phenylethyl, NH-  
phenylpropyl, N-bismethyl, N-bisethyl, OH.

30 17. Compound as claimed in any of the claims 1-16,  
wherein

R<sub>3</sub> is amino, NH-phenyl, NH-tert-butyl, NH-tert-  
butylcarbamoyl, NH-phenylcarbamoyl; NH-butyryl, NH-benzoyl,  
NH-benzyl, N-bismethyl, N-bisethyl, OH.

18. Compound as claimed in any of the claims 1-17,  
wherein

$R_3$  is amino, NH-phenyl, NH-tert-butyl, NH-tert-  
5 butylcarbamoyl, NH-benzoyl, N-bismethyl, OH.

19. Compound as claimed in any of the claims 1-18,  
wherein  $R_3$  is amino, NH-tert-butyl.

10 20. Compound as claimed in any of the claims 1-19,  
wherein  $R_4$  and  $R_5$  are independently O(H) or S(H).

21. Compound as claimed in any of the claims 1-20,  
wherein  $R_4$  and  $R_5$  are O(H).

15

22. Compound as claimed in any of the claims 1-21,  
wherein the compound is selected from the group consisting 8-  
bromo-2'-deoxyadenosine-3',5'-cyclic monophosphate;  
8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic  
20 monophosphate; 8-(4-chloro-phenylthio)-N<sup>6</sup>-phenyl-2'-  
deoxyadenosine-3',5'-cyclic monophosphate;  
8-bromo-2'-O-methyladenosine-3',5'-cyclic monophosphate;  
8-(4-chloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-methylamino-2'-O-methyladenosine-3',5'-  
25 cyclic monophosphate; 8-methylthio-2'-O-methyladenosine-  
3',5'-cyclic monophosphate; 8-(4-fluoro-phenylthio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
8-(4-methyl-cumarinyl-7-thio)-2'-O-methyladenosine-3',5'-  
cyclic monophosphate; 8-(naphthyl-2-thio)-2'-O-  
30 methyladenosine-3',5'-cyclic monophosphate;  
8-phenylthio-2'-O-methyladenosine-3',5'-cyclic monophosphate;  
8-(4-nitro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate;

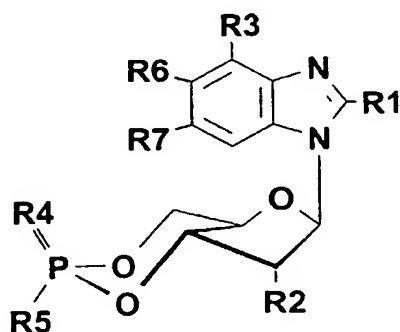
- 8-(2-amino-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-benzylthio-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-n-hexylthio-2'-O-methyladenosine-3',5'-  
cyclic monophosphate; 8-phenylethylamino-2'-O-  
5 methyladenosine-3',5'-cyclic monophosphate;  
8-(4-methoxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-isopropylthio-2'-O-methyladenosine-3',5'-  
cyclic monophosphate; 8-(benzimidazolyl-2-thio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
10 8-(2-hydroxy-ethylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-ethylthio-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-(2-amino-ethylthio)-2'-O-methyladenosine-  
3',5'-cyclic monophosphate;  
8-(pyridinyl-2-thio)-2'-O-methyladenosine-3',5'-cyclic  
15 monophosphate; 8-(benzothiazolyl-2-thio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
8-(4-methyl-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-(3-methoxy-phenylthio)-2'-O-methyladenosine-  
3',5'-cyclic monophosphate;  
20 8-(4-isopropyl-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-(2,3,5,6-tetrafluoro-phenylthio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
8-(4-hydroxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-(2,4-dichloro-phenylthio)-2'-O-  
25 methyladenosine-3',5'-cyclic monophosphate;  
8-(4-chloro-phenylthio)-2'-(N,N-dimethyl)-carbamoyl-  
adenosine-3',5'-cyclic monophosphate;  
8-methoxy-2'-O-methyladenosine-3',5'-cyclic monophosphate;  
8-benzyloxy-2'-O-methyladenosine-3',5'-cyclic monophosphate;  
30 8-bromo-2'-O-methyladenosine-3',5'-cyclic  
monophosphorothioate, Sp-isomer; 8-bromo-2'-O-  
methyladenosine-3'-5'-cyclic monophosphorothioate, Rp-isomer,  
8-(4-chloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphorothioate, Sp-isomer; 8-(4-chloro-phenylthio)-2'-

O-methyladenosine-3',5'-cyclic monophosphorothioate, Rp-isomer; 8-bromo-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Rp-isomer; 8-bromo-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp-isomer;

5 8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Rp-isomer; 8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp-isomer; and 8-cyclohexylamino-2'-deoxyadenosine-3',5'-cyclic monophosphate; 8-chloro-2'-O-methyladenosine-3',5'-cyclic

10 monophosphate; N<sup>6</sup>-tert-butyl-8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic monophosphate; 5,6-Dichloro-1-β-D-ribofuranosyl-2'-O-methylbenzimidazole-3',5'-cyclic monophosphate;

15 23. Compound as claimed in claims 1-21, wherein the deaza-analogue is a compound having the structural formula II:



wherein

R1-R5 are as defined in any of the claims 1-21, and

30 wherein

R6 and R7 can be independently H, halogen, alkyl, nitro, amino, and/or alkoxy.

24. Compound as claimed in claim 23, wherein



R1-R3 are as defined in any of the claims 1-21;  
R4 and R5 can be independently O or S; and  
R6 and R7 can be independently F, Cl, Br or I.

5        25. Compound as claimed in claim 23 or 24, wherein R6  
and R7 are Cl.

26. Compound as claimed in claim 23, 24 or 25, wherein  
R2 is O-alkyl.

10

27. Compound as claimed in any of the claims 23-26,  
wherein

R1 and R3 are hydrogen;

R2 is O-alkyl; and

15

R6 and R7 are Cl.

28. Compound as claimed in any of the claims 23-27,  
wherein the deaza-analogue is selected from the group  
consisting of 1-deaza-adenine analogues, 3-deaza-adenine  
20 analogues, 7-deaza-adenine analogues, 1,3-dideaza-adenine  
analogues, 1,7-dideaza-adenosine analogues and benzimidazole  
analogues, preferably 5,6-dichlorobenzimidazole.

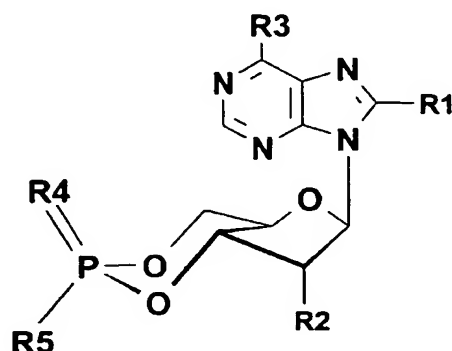
29. Compound as claimed in any of the claims 1-28 for  
25 modulating the activity of exchange proteins directly  
activated by cAMP (Epacs).

30. Compound as claimed in any of the claims 1-28 for  
discriminating between Epac- and PKA-mediated signal  
30 transduction pathways.

31. Compound as claimed in any of the claims 1-30 for  
use as a medicament.

32. Pharmaceutical composition comprising one or more of the compounds as claimed in claims 1-31, and one or more pharmaceutically acceptable excipients.

33. Use of a compound having the structural formula (I)



wherein,

R<sub>1</sub> can be independently H, halogen, azido, alkyl, aryl, amido-alkyl, amido-aryl, OH, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, SeH, Se-alkyl, Se-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, cycloalkylamino;

R<sub>2</sub> can be independently H, halogen, azido, O-alkyl, S-alkyl, Se-alkyl, NH-alkyl, N-bisalkyl, alkyl-carbamoyl, cycloalkylamino, silyl;

R<sub>3</sub> can be independently H, halogen, OH, azido, amido-alkyl, amido-aryl, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, NH-alkyl-carbamoyl, cycloalkylamino;

and wherein

R<sub>4</sub> is O(H) or S(H); and

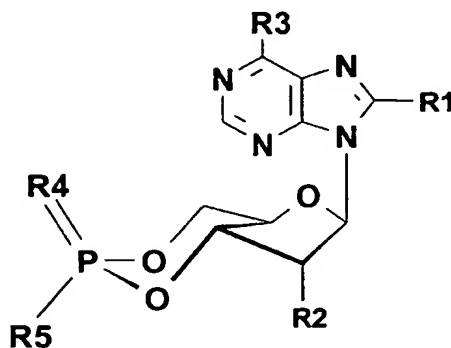
R<sub>5</sub> is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; or

R<sub>4</sub> is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; and

$R_5$  is O(H) or S(H); and pharmaceutically acceptable salts, esters, and/or solvates thereof as a medicament.

34. Use of a compound having the structural formula (I)

5



wherein,

$R_1$  can be independently H, halogen, azido, alkyl, aryl, amido-alkyl, amido-aryl, OH, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, SeH, Se-alkyl, Se-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, cycloalkylamino;

$R_2$  can be independently H, halogen, azido, O-alkyl, S-alkyl, Se-alkyl, NH-alkyl, N-bisalkyl, alkyl-carbamoyl, cycloalkylamino, silyl;

$R_3$  can be independently H, halogen, OH, azido, amido-alkyl, amido-aryl, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, NH-alkyl-carbamoyl, cycloalkylamino;

and wherein

$R_4$  is O(H) or S(H); and

$R_5$  is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; or

$R_4$  is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; and

$R_5$  is O(H) or S(H); and pharmaceutically acceptable salts, esters, and/or solvates thereof in the manufacture of a medicament for the treatment of human diseases.

35. Use as claimed in claim 33 or 34, wherein

R<sub>1</sub> is H, halogen, azido, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, Se-aryl.

5

36. Use as claimed in claim 33, 34 or 35, wherein

R<sub>1</sub> is H, halogen, azido, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, Se-aryl.

10

37. Use as claimed in any of the claims 33-35, wherein

R<sub>1</sub> is H, Br, Cl, I, azido, 2-chlorophenylthio, 3-chlorophenylthio, 4-chlorophenylthio, 2-bromophenylthio, 3-bromophenylthio, 4-bromophenylthio, methylamino, methylthio, ethylthio, n-propylthio, n-butylthio, n-pentylthio, n-hexylthio, 2-fluorophenylthio, 3-fluorophenylthio, 4-fluorophenylthio, 4-methylcumariny, naphthyl-2-thio, phenylthio, 4-nitrophenylthio, 2-aminophenylthio, 3-aminophenylthio, 4-aminophenylthio, benzylthio, phenylethylamino, 3-phenyl-propylamino, 2-methoxyphenylthio, 3-methoxyphenylthio, 4-methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-hydroxyethylthio, 2-aminoethylthio, pyridinylthio, benzothiazolylthio, 2-methylphenylthio, 3-methylphenylthio, 4-methylphenylthio, 2-isopropylphenylthio, 4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy, ethoxy, propoxy, butoxy, benzyloxy, 4-methylbenzyloxy, 4-methoxybenzyloxy, 4-fluorobenzyloxy, 4-chlorobenzyloxy, 4-bromobenzyloxy, phenyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-isopropoxyphenylthio, 4-methylthiophenylthio, 6-aminohexylamino, 2,3-dichlorophenylthio, 2,5-dichlorophenylthio, 2,4-difluorophenylthio, 2,5-dimethoxyphenylthio, 2,5-dimethylthiophenylthio, 2,6-dimethylthiophenylthio, 2,6-dichlorophenylthio.

30

38. Use as claimed in any of the claims 33-37, wherein  
R<sub>1</sub> is H, Br, Cl, azido, 2-chlorophenylthio, 3-  
chlorophenylthio, 4-chlorophenylthio, 2-bromophenylthio, 3-  
5 bromophenylthio, 4-bromophenylthio, methylamino, methylthio,  
ethylthio, n-propylthio, n-butylthio, n-pentylthio, n-  
hexylthio, 2-fluorophenylthio, 3-fluorophenylthio, 4-  
fluorophenylthio, 4-methylcumariny, naphthyl-2-thio,  
phenylthio, 4-nitrophenylthio, 2-aminophenylthio, 3-  
10 aminophenylthio, 4-aminophenylthio, benzylthio,  
phenylethylamino, 2-methoxyphenylthio, 3-methoxyphenylthio,  
4-methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-  
hydroxyethylthio, 2-aminoethylthio, pyridinylthio,  
benzothiazolylthio, 2-methylphenylthio, 3-methylphenylthio,  
15 4-methylphenylthio, 2-isopropylphenylthio, 4-  
isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-  
hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy,  
benzyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-  
isopropoxyphenylthio, 4-methylthiophenylthio, 6-  
20 aminohexylamino, 2,3-dichlorophenylthio, 2,5-  
dichlorophenylthio, 2,4-difluorophenylthio, 2,5-  
dimethoxyphenylthio, 2,5-dimethylthiophenylthio, 2,6-  
dimethylthiophenylthio, 2,6-dichlorophenylthio.

25 39. Use as claimed in any of the claims 33-38, wherein  
R<sub>1</sub> is H, Br, Cl, azido, 4-chlorophenylthio, methylamino,  
methylthio, 4-fluorophenylthio, 4-methylcumariny, naphthyl-2-  
thio, phenylthio, 4-nitrophenylthio, 2-aminophenylthio,  
benzylthio, n-hexylthio, phenylethylamino, 4-  
30 methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-  
hydroxyethylthio, ethylthio, 2-aminoethylthio, pyridinylthio,  
benzothiazolylthio, 4-methylphenylthio, 3-methoxyphenylthio,  
4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-  
hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy,

benzyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-isopropoxyphenylthio, 4-methylthiophenylthio, 6-aminohexylamino.

5           40. Use as claimed in any of the claims 33-39, wherein  
R<sub>1</sub> is Cl, Br or S-aryl.

          41. Use as claimed in claim 40, wherein  
R<sub>1</sub> is Cl, Br, 4-chlorophenylthio, 4-fluorophenylthio,  
10   naphtyl-2-thio, phenylthio, 4-nitrophenylthio, 4-methoxyphenylthio, pyridinyl-2-thio, 4-methylphenylthio, 4-isopropylphenylthio, 2,3,5,6-tetrafluoro-phenylthio, 4-hydroxyphenylthio, or 2,4-dichloro-phenylthio.

15           42. Use as claimed in claim 40 or 41, wherein  
R<sub>1</sub> is 4-chlorophenylthio, 4-fluorophenylthio, 4-methoxyphenylthio, 4-methylphenylthio, 4-hydroxyphenylthio.

          43. Use as claimed in any of the claims 33-42, wherein  
20   R<sub>2</sub> is H, halogen, azido, O-alkyl, S-alkyl.

          44. Use as claimed in any of the claims 33-43, wherein  
R<sub>2</sub> is H, Cl, Br, I, O-alkyl, S-methyl, S-ethyl.

25           45. Use as claimed in any of the claims 33-44, wherein  
R<sub>2</sub> is H, Cl, Br, O-methyl, O-ethyl, O-propyl, O-butyl, O-isobutyl, S-methyl.

          46. Use as claimed in any of the claims 33-45, wherein  
30   R<sub>2</sub> is O-methyl, O-ethyl, O-propyl, O-butyl, O-isobutyl.

          47. Use as claimed in any of the claims 33-45, wherein  
R<sub>2</sub> is O-methyl.

48. Use as claimed in any of the claims 33-47, wherein  $R_3$  is amino, NH-alkyl, N-bisalkyl, NH-aryl, NH-alkyl-carbamoyl, N-bisalkyl-carbamoyl, amido-alkyl, amido-aryl, OH.

5 49. Use as claimed in any of the claims 33-48, wherein  $R_3$  is amino, NH-phenyl, NH-tert-butyl, NH-tert-butylcarbamoyl, NH-phenylcarbamoyl, NH-acetyl, NH-propionyl, NH-butyryl, NH-benzoyl, NH-benzyl, NH-phenylethyl, NH-phenylpropyl, N-bismethyl, N-bisethyl, OH.

10 50. Use as claimed in any of the claims 33-49, wherein  $R_3$  is amino, NH-phenyl, NH-tert-butyl, NH-tert-butylcarbamoyl, NH-phenylcarbamoyl; NH-butyryl, NH-benzoyl, NH-benzyl, N-bismethyl, N-bisethyl, OH.

15 51. Use as claimed in any of the claims 33-50, wherein  $R_3$  is amino, NH-phenyl, NH-tert-butyl, NH-tert-butylcarbamoyl, NH-benzoyl, N-bismethyl, OH.

20 52. Use as claimed in any of the claims 33-51, wherein  $R_3$  is amino, NH-tert-butyl.

53. Use as claimed in any of the claims 33-51, wherein  $R_4$  and  $R_5$  are independently O(H) or S(H).

25 54. Use as claimed in any of the claims 33-51, wherein  $R_4$  and  $R_5$  are O(H).

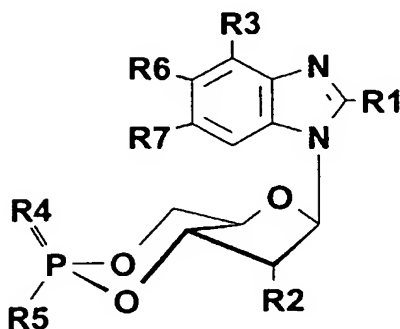
55. Use as claimed in any of the claims 33-54, wherein  
30 the compound is selected from the group consisting 8-bromo-2'-deoxyadenosine-3',5'-cyclic monophosphate;  
8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic monophosphate; 8-(4-chloro-phenylthio)-N<sup>6</sup>-phenyl-2'-deoxyadenosine-3',5'-cyclic monophosphate;

8-bromo-2'-O-methyladenosine-3',5'-cyclic monophosphate;  
8-(4-chloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-methylamino-2'-O-methyladenosine-3',5'-  
cyclic monophosphate; 8-methylthio-2'-O-methyladenosine-  
5 3',5'-cyclic monophosphate; 8-(4-fluoro-phenylthio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
8-(4-methyl-cumarinyl-7-thio)-2'-O-methyladenosine-3',5'-  
cyclic monophosphate; 8-(naphthyl-2-thio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
10 8-phenylthio-2'-O-methyladenosine-3',5'-cyclic monophosphate;  
8-(4-nitro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate;  
8-(2-amino-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-benzylthio-2'-O-methyladenosine-3',5'-cyclic  
15 monophosphate; 8-n-hexylthio-2'-O-methyladenosine-3',5'-  
cyclic monophosphate; 8-phenylethylamino-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
8-(4-methoxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-isopropylthio-2'-O-methyladenosine-3',5'-  
20 cyclic monophosphate; 8-(benzimidazolyl-2-thio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
8-(2-hydroxy-ethylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-ethylthio-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-(2-amino-ethylthio)-2'-O-methyladenosine-  
25 3',5'-cyclic monophosphate;  
8-(pyridinyl-2-thio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-(benzothiazolyl-2-thio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
8-(4-methyl-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
30 monophosphate; 8-(3-methoxy-phenylthio)-2'-O-methyladenosine-  
3',5'-cyclic monophosphate;  
8-(4-isopropyl-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-(2,3,5,6-tetrafluoro-phenylthio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;



8-(4-hydroxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphate; 8-(2,4-dichloro-phenylthio)-2'-O-  
methyladenosine-3',5'-cyclic monophosphate;  
8-(4-chloro-phenylthio)-2'-(N,N-dimethyl)-carbamoyl-  
5 adenosine-3',5'-cyclic monophosphate;  
8-methoxy-2'-O-methyladenosine-3',5'-cyclic monophosphate;  
8-benzyloxy-2'-O-methyladenosine-3',5'-cyclic monophosphate;  
8-bromo-2'-O-methyladenosine-3',5'-cyclic  
monophosphorothioate, Sp-isomer; 8-bromo-2'-O-  
10 methyladenosine-3'-5'-cyclic monophosphorothioate, Rp-isomer,  
8-(4-chloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic  
monophosphorothioate, Sp-isomer; 8-(4-chloro-phenylthio)-2'-  
O-methyladenosine-3',5'-cyclic monophosphorothioate, Rp-  
isomer; 8-bromo-2'-deoxyadenosine-3',5'-cyclic  
15 monophosphorothioate, Rp-isomer; 8-bromo-2'-deoxyadenosine-  
3',5'-cyclic monophosphorothioate, Sp-isomer;  
8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic  
monophosphorothioate, Rp-isomer; 8-(4-chloro-phenylthio)-2'-  
deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp-isomer;  
20 and 8-cyclohexylamino-2'-deoxyadenosine-3',5'-cyclic  
monophosphate; 8-chloro-2'-O-methyladenosine-3',5'-cyclic  
monophosphate, N<sup>6</sup>-tert-butyl-8-(4-chloro-phenylthio)-2'-  
deoxyadenosine-3',5'-cyclic monophosphate.

56. Use as claimed in any of the claims 21-29, wherein the deaza analogue is a compound having the structural formula II:



wherein

R1-R5 are as defined in any of the claims 1-21, and wherein

R6 and R7 can be independently H, halogen, alkyl, nitro, amino, and/or alkoxy.

57. Use as claimed in claim 56, wherein

R1-R3 are as defined in any of the claims 1-21;

R4 and R5 can be independently O or S; and

R6 and R7 can be independently F, Cl, Br or I.

58. Use as claimed in claim 56 or 57, wherein R6 and R7 are Cl.

59. Use as claimed in claim 56, 57 or 58, wherein R2 is O-alkyl.

60. Use as claimed in any of the claims 56-59, wherein R1 and R3 are hydrogen; R2 is O-alkyl; and

R6 and R7 are Cl.

61. Use as claimed in any of the claims 56-60, wherein the deaza-analogue is selected from the group consisting of  
5 1-deaza-adenine analogues, 3-deaza-adenine analogues, 7-deaza-adenine analogues, 1,3-dideaza-adenine analogues, 1,7-dideaza-adenosine analogues and benzimidazole analogues, preferably 5,6-dichlorobenzimidazole.

10 62. Use as claimed in any of the claims 33-61 in the manufacture of a medicament for the treatment of cancer.

63. Use as claimed in any of the claims 33-61 in the manufacture of a medicament for the treatment of chronic  
15 inflammation.

64. Use as claimed in any of the claims 33-61 in the manufacture of a medicament for the treatment of thrombosis.

20 65. Use as claimed in any of the claims 33-61 in the manufacture of a medicament for the treatment of type-2 diabetes mellitus.